

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
Contract No: DAAD19-02-D-0001/ Delivery Order 0456 with Battelle Columbus Operations for the U.S. Army
Environmental Policy Institute

APRIL 2008 REPORT

Note to Readers: Pages 1-12 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 13.

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Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE APR 2008		2. REPORT TYPE		3. DATES COVERED 00-00-2008 to 00-00-2008	
4. TITLE AND SUBTITLE Worldwide Emerging Environmental Issues Affecting the U.S. Military. April 2008				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) The Millennium Project ,4421 Garrison Street, N.W. ,Washington,DC,20016-4055				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 24	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Item 1. Briefings on Environmental Security at NATO Conference

Prior to the NATO Summit in April, the NATO Security Science Forum on Environmental Security held in Brussels on March 12th addressed security implications of environmental issues such as climate change, water, energy security, and natural catastrophes. It also looked at environmental security forecasting and cooperation with other international organizations to increase environmental security. Webcasts of the presentations are available on the first website listed below. After the NATO Summit in April in Romania, Russian President Vladimir Putin and NATO leaders agreed to cooperate in several areas, including environmental security.

Military Implications:

The papers and PowerPoint presentations should also be reviewed and circulated to relevant military personnel. If not already done, the *Army Strategy for the Environment* should be shared with the participants in this Forum, seeking opportunities for joint implementation of the international aspects and offering the Strategy as a model for other NATO nations.

Sources:

NATO Security Science Forum on Environmental Security

<http://www.nato.int/docu/comm/2008/0803-science/0803-science.htm>

NATO-Russia Council Concludes 2008 Bucharest Summit

<http://www.america.gov/st/peacesec-english/2008/April/20080404162813idybeekcm0.9275629.html>

Item 2. Half of Transported European Hazardous Waste Could Be Illegal—How Much More Elsewhere?

Hazardous substances such as ozone-depleting substances and toxic chemicals are increasingly profitable, difficult to tackle, and involve international organized crime. Estimates from the early 2000s suggest that 10-20% of the ozone-depleting substance trade was illegal (a value of \$25-60 million). The Basel Convention estimates international hazardous waste movement to be at least 8.5 million tonnes per year. Although it is difficult to estimate the illegal portion of this, a project undertaken in 13 European countries found that over 50% of the waste shipments examined were illegal. One could imagine higher percentages in countries with fewer inspection capabilities and in failed states. E-waste (electronic waste, some of which is hazardous) is growing worldwide. About 70% of it is dumped in developing countries in Asia and Africa. At a recent high-level meeting on enforcement issues held by the World Customs Organization, representatives of the United Nations Environmental Programme (UNEP), customs administrations, and other interested organizations agreed on an Action Plan to improve enforcement and tackle increasing environment crime. The Plan calls for increased detection efficiency by customs offices, creation of environmental crime units, and international co-operation and information exchange.

Military Implications:

Plans for future military-to-military assistance should consider training and logistics support to counter illegal environmental trade.

Sources:

UNEP correspondence with Millennium Project staff (see [Appendix](#))

Environment crime now high on the world agenda

<http://www.unep.org/Documents/Multilingual/Default.asp?DocumentID=530&ArticleID=5764&l=en>

The Growth and Control of International Environmental Crime—Background papers

<http://www.illegal-logging.info/uploads/Intenvcrime2007backgroundpapers.pdf>

Item 3. Climate Change and Access to Water Addressed as Human Rights

The seventh regular session of the Human Rights Council adopted 36 resolutions on a wide range of issues, including two major reports to be delivered in three years to the tenth session of the Council: one on water as a human right, and another on the relationship between climate change and human rights. In the meantime, 2008 is the 60th anniversary of the Universal Declaration of Human Rights, which will also increase reflections on these two topics.

Military Implications:

Military personnel should be asked to consider the following questions: If water were to become a human right in some countries, how might their militaries be called upon to insure that right? How might that affect military-to-military assistance? What new opportunities might that present to further international environmental security?

Sources:

U.N. human rights body turns to climate change

<http://www.reuters.com/article/environmentNews/idUSL2778449820080328?feedType=RSS&feedName=environmentNews&sp=true>

Human Rights Council Adopts 36 Resolutions and Extends Mandates of 13 Special Procedures at Seventh Regular Session

<http://www.unhchr.ch/hurricane/hurricane.nsf/view01/AADEFF2389520CC0C125741A0071BB93?opendocument>

Item 4. International Alliance of Forest Peoples

The International Alliance of Forest Peoples was established by the participants in the Peoples of the Forest and Climate Change workshop held in Manaus, Brazil. The scope of the Alliance is to improve international collaboration to guarantee the respect of forest people's rights to land and natural resources and to their traditional livelihoods, facilitate their adaptation to climate change, and improve their participation in the mechanisms for the reduction of emissions from deforestation and forest degradation. The Declaration was signed by 11 countries: Brazil, Ecuador, Colombia, Costa Rica, Guyana, French Guyana, Paraguay, Nicaragua, Venezuela, Suriname, and Panama. Delegations from Africa (Democratic Republic of the Congo) and Asia (Indonesia) and observers from the UN and NGOs from Brazil, England and the U.S. also attended the meeting.

Military Implications:

Most likely the International Alliance of Forest Peoples will increasingly expand and include forest people from other regions around the world. It is reasonable to speculate that new regulations concerning forest activities will emerge. The military should follow the Alliance's activities both to help them achieve their goals, in order to increase peace and security, and to be prepared for eventual restrictions that might impact military activities.

Source:

International Alliance will unite the forest peoples of the world

http://forestnewswire.com/index.php?option=com_content&view=article&id=122:international-alliance-will-unite-the-forest-peoples-of-the-world&catid=1:latest

Item 5. Technological Advances with Environmental Security Implications**5.1 New Detection and Cleanup Techniques****5.1.1 Chemical Agent Cleanser Developed in Canada**

A new non-toxic method for rapidly and safely destroying toxic agents, such as chemical weapons and pesticides, has been developed by researchers from Queen's University, Canada. The alcohol-based system is non-corrosive, acts within minutes, and proved to be more than 99% effective in eliminating organophosphorus agents, such as Tabun, Soman and VX. It might represent a safe and environmentally friendly option for destroying stockpiles of chemical weapons, environmental spill cleanup, and rapid response to possible terrorist attacks using chemical weapons agents. It is safe in most conditions and has no special storage requirements.

Military Implications:

The military should investigate the applicability of this new decontamination system.

Sources:

"Green" method decontaminates deadly nerve agents

http://qnc.queensu.ca/story_loader.php?id=47fb870ea02f1

New nerve agent cleansing method created

http://www.upi.com/NewsTrack/Science/2008/04/15/new_nerve_agent_cleansing_method_created/8254/

5.1.2 Animal-Robot Team Effective for UXO Clearance

Animal-robot teams can be a safe and efficient alternative for post-conflict area scanning and clean-up. A remotely controlled robot leading a dwarf mongoose (*Helogale parvula*) trained to sniff out explosives is an approach demonstrated by Thrishantha Nanayakkara and colleagues at the University of Moratuwa in Sri Lanka. The group APOPO in Tanzania has been training Gambian giant pouched rats for similar manually-led operations, but the robot guidance eliminates the human risk factor. The two animals mentioned are more easily trained and perform better than dogs.

Military Implications:

The military should investigate the advantages of this improved partnership technique for post-conflict cleanup. However, use of the mongoose, a species alien to most nations, must be accompanied by precautions to prevent feral breeding and endangerment of local species and the spread of rabies. Use of a single sex or neutering might be the solution to problems, such as were created decades ago by introduction of the mongoose to control snakes and rats in Grenada.

Sources:

Mongoose-robot duo sniff out landmines on the cheap

<http://technology.newscientist.com/channel/tech/mg19826535.900?DCMP=NLC-nletter&nsref=mg19826535.900>

Video of the mongoose and robot pair sniffing our landmines

<http://uk.youtube.com/watch?v=fSQpzh02JaA>

Giant Hero Rats Being Trained to Sniff Out Land Mines

<http://www.buzzle.com/articles/giant-hero-rats-being-trained-to-sniff-out-land-mines.html>

Trained Rats Sniff out TB, Land Mines in Tanzania

<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/TANZANIAEXTN/0,,contentMDK:21462478~menuPK:287357~pagePK:141137~piPK:141127~theSitePK:258799,00.html>

5.2 Increasing Energy Efficiency Technologies

5.2.1 All-Electric cars coming from Norway and China with More than Hundred Mile Ranges

An all-electric car is expected to be available for purchase next year (2009) in the U.S.; it is called “Think City” from Think North America, a Norwegian-California joint venture startup. The car runs on sodium or lithium batteries and can travel up to 110 miles on one charge. In 3-5 years BYD Auto Co. of Shenzhen, China, plans to market its all-electric car in the U.S. with a 185-mile range on a single full charge.

Military Implications:

If DARPA does not already have more efficient batteries in R&D now, then the military should evaluate the Norwegian and Chinese batteries for retrofitting military equipment using large-battery power.

Sources:

BYD Company www.byd.com

China's BYD Auto Co. to Unveil All-Electric Car

<http://online.wsj.com/article/SB120849294773525787.html>

Kleiner Perkins Venture to Sell Electric Car in US

<http://www.planetark.com/dailynewsstory.cfm/newsid/48084/story.htm>

5.2.2 New Solar Cell Design Raises Efficiency

Prof. Ely Sachs and colleagues at MIT have developed a solar cell design that offers a 27% increase in efficiency over existing devices. They predict that the cells' present cost of \$1.85/watt can be reduced to about \$1.35/watt. The new multi-crystalline silicon cells embody several improvements, which increase the amount of light reaching the active elements in the cells. Commercialization of the development is being done by 1366 Technologies. [See also *New Project for Nanowire Solar Cells* in January 2008, *Reducing Military Footprint with Solar Energy at 30 Cents per Watt* in November 2007, and other similar items in previous environmental security reports.]

Military Implications:

The military should follow evolution of this solar cell technology for implementation to improve materiel power systems and to reduce the military environmental footprint.

Sources:

MIT spinoff shoots for solar power at \$1 per watt

http://www.news.com/8301-11128_3-9903728-54.html

MIT spin-off plans to manufacture cheap, efficient solar cells

<http://www.physorg.com/news125842769.html>

5.2.3 New Material for Storing Hydrogen

Physicists Adam Phillips and Bellave Shivaram of the University of Virginia have found a new class of materials, transition metal-ethylene complexes, which may offer a much more efficient way of storing hydrogen for fuel cell applications than previous substances. An example uses titanium with an ethylene nanostructure, which their measurements indicate will hold 12% by weight of hydrogen, more than twice the target of 5.4% set by DOE to support the development of hydrogen fuel cell vehicles.

Military Implications:

Although the investigators say that it is critical to note that their work is at a very early stage, the military should follow this development in environment-friendly energy as it progresses toward a stage of practical application.

Source:

Physicists find new material for storing hydrogen

New story: <http://physicsworld.com/cws/article/news/33614> (Registration required; full text in the [Appendix](#))

5.3 NanoRadio Offers Low Impact Environmental Monitoring and Communications

Prof. Alex Zettl of the Univ. of California's Berkeley Nanosciences & Nanoengineering Institute and his group have developed a nanoscale radio, in which the key circuit consists of a single carbon nanotube. This work derived from an effort to create inexpensive wireless environmental sensors.

Military Implications:

The military should follow this work as it progresses toward applicability to fieldable environmental surveillance systems for both battlefield monitoring and environmental management.

Source:

TR10: NanoRadio

http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=emerging08&id=20244

5.4 Antigenic Maps Help Trace Development of Diseases

Derek Smith, professor of infectious disease informatics at Cambridge University's Department of Zoology, and colleagues at Los Alamos National Laboratory and Erasmus Medical Center in Rotterdam, have developed software that, according to a *Scientific American* article, "create[s] an antigenic [stimulates the production of antibodies] map that documents 13,000 human flu strains isolated over the past five years. When these results are plotted on a digital antigenic map, researchers can see in fine detail how the body's immune system responds to different mutations of the virus."

Military Implications:

The military should investigate this technique to evaluate its usefulness in assessing the environment in a biological warfare situation.

Source:

Maps Point the Way to Fighting the Flu Virus

<http://www.sciam.com/article.cfm?id=antigenic-cartography-maps>

Item 6. Updates on Previously Identified Issues**6.1 Chemical Weapons Convention Gets New Boost**

The Second Review Conference for the Chemical Weapons Convention was held in The Hague, April 7-18, 2008, attended by delegates from 114 of the 183 treaty states. The main issues brought up by participants were: threats posed by the use of chemical weapons by nonstate actors; deadlines for chemical weapons destruction (specifically named were Russia and the U.S., which have to destroy their chemical warfare agents by April 29, 2012, and Japan for destruction of its chemical weapons stockpiles in China); and universal adherence to the treaty. Delegates produced a report that reviews the treaty procedures and implementation issues, and urges the 12 countries that are not yet Party (Angola, the Bahamas, Dominican Republic, Egypt, Guinea-Bissau, Iraq, Israel, Lebanon, Myanmar, North Korea, Somalia and Syria) to join the international disarmament and nonproliferation treaty “as a matter of urgency and without preconditions.” The report does not address the convention’s relation to some new science and technology developments that could produce new threats—such as development of new incapacitating agents, advances in biology and nanotechnology, and industry verification mechanisms. It was proposed that, from now on, the Scientific Advisory Board of the Organization for the Prohibition of Chemical Weapons meet twice a year, not just once as it has previously. [See also *New Concerns Rising over Chemical Weapons* in April 2007 and other related items in previous environmental security reports.]

In the meantime, Pacific Consultants International warns that Japan is not on schedule for meeting its obligations towards China in the recovery and destruction of hundreds of thousands of chemical weapons abandoned at the end of World War II and will most probably not meet the April 2012 deadline, due to management problems. [See also *Japanese Chemical Weapons Cleaning in China Yet to be Completed* in June 2007, and other previous environmental security reports on this issue.]

Military Implications:

[Similar to previous on the same issue] Those with responsibilities in this area should: 1) consider assessing national and international opportunities for assisting in compliance and improving effectiveness of the CWC regulations, and 2) stress attention to and inclusion of new threats.

Sources:

Second Review Conference

<http://www.opcw.org/rc2/index.html>

Nations Demand Adherence to CW Disposal Deadlines

<http://204.71.60.36/d%5Fnewswire/issues/2008/4/8/9cb5bc8a%2D5136%2D4594%2Da750%2Dc5108a7b58ec.html>

Chemical arms disposal pricey / China project hit for opaque management, exorbitant costs

<http://www.yomiuri.co.jp/dy/national/20080424TDY02307.htm>

Japan’s efforts toward early destruction of ACW in China

[http://www.opcw.org/docs/csp/rc2/en/rc2nat20\(e\).pdf](http://www.opcw.org/docs/csp/rc2/en/rc2nat20(e).pdf)

6.2 African Countries Call for International Ban on Cluster Bombs

The first meeting of African countries on cluster bombs adopted the “Livingstone Declaration,” endorsed by 38 out of 39 countries (South Africa, one of the continent’s two producer states was the exception.) The strong political declaration is formally committing the African countries to the negotiations for a global cluster munitions ban treaty to be held in Dublin, Ireland, May 19-30, 2008. There was widespread support for a broad definition of cluster munitions to avoid exceptions based on so-called ‘technical fixes,’ and on the need for comprehensive liability provisions for the affected communities. The Dublin meeting should conclude the Oslo process and agree on the final terms and language of a cluster bombs ban treaty, which would then be opened for signature before the end of 2008. [See also *Negotiations Continue for an International Instrument to Ban Cluster Munitions* in November 2007 and other items on this issue in previous environmental security reports.]

Military Implications:

[Same as previous on this issue] The military should be prepared for possible requirements to phase out cluster munitions use and to intensify efforts for helping other countries and regions do the same and/or deal with their aftereffects.

Sources:

Strong Landmark African Declaration to Ban Cluster Bombs - Only South Africa Calls for Exceptions to the Ban

http://www.icbl.org/news/zambia_pr

The Cluster Munitions Process <http://www.clusterprocess.org>

6.3 Questions on Bisphenol A Risk Raised Again

The Canadian health ministry is said to be ready to declare BPA a dangerous substance, and the US National Toxicology Program, part of the National Institutes of Health, has expressed concern over its effects on the very young. [See also *Possible Risk with Bisphenol A Receiving Increased Attention* in December 2007 environmental security report]

Military Implications:

The military should be prepared to phase out its use of this chemical, if the projected determinations conclude that it poses a risk.

Sources:

Canada Could Ban Baby Bottles Containing Bisphenol A

<http://www.ens-newswire.com/ens/apr2008/2008-04-22-05.asp>

Plastic bottle chemical may be harmful: agency

<http://www.reuters.com/article/healthNews/idUSN1513929320080415?sp=true>

6.4 Climate Change

A summary of some of the noteworthy news from this month follows, with more detailed descriptions of each in the [Appendix](#).

6.4.1 Scientific Evidences

Salinity of the sea around Antarctica is changing, which could have significant effects on the world’s climate and ocean currents.

For the past 20 years, no significant correlation can be established between climate change and the Sun's activity; this supports the theory that man-made greenhouse gas emissions outweigh solar activity variations as a cause of global warming.

Although no consensus exists on the link between global warming and the number of hurricanes, scientists agree that storms' damaging forces might be increased by climate change.

6.4.2 Food and Water Security

Warnings increase over continuous escalation of food prices worldwide, which increases distress in poor regions and thus raises the danger of social and political unrest. Of the estimated approximately 40 countries at "food crisis" risk, some 20 are or were recently affected by internal conflicts, and 21 have suffered from floods, droughts, and other weather disasters.

The International Assessment of Agricultural Science and Technology for Development *Synthesis Report* presents comprehensive analyses of the worldwide agricultural situation and makes recommendations.

The International Federation of Red Cross and Red Crescent Societies launched a new five-year food security strategy for Africa focussing on long-term investments to improve food security programmes in 15 African countries.

The Council for Trade and Economic Development (COTED) agreed that the Caribbean Community Environmental and Natural Resource Framework should address adaptation to climate change effects and problems with food security and freshwater resources.

In Australia, a six-year-long drought reduced Australia's rice crop by 98%, affecting local populations, prices, and other customer countries' food source.

A conference hosted by the European Water Forum in the European Parliament on 16 April, warned again of growing water scarcity concerns, calling for speedy solutions to combat water shortages, which might include higher water prices to deter overuse.

Water security will also be affected by earlier melting of glaciers and mountain snow, affecting some 70% of the world's population.

The UN Convention to Combat Desertification Secretariat is convening a high-level policy dialogue to be held in Bonn, Germany on May 27, 2008.

6.4.3 Melting Glaciers and Sea Ice

Melting ice caps because of global warming may trigger more volcanic eruptions, such as in Iceland, where melting ice mass greatly decreases pressure on confined hot earth crust. That pressure reduction permits those rocks to melt and form additional magma for future eruptions.

Arctic permanent ice shelves are breaking off or cracking at a rate worse than feared. The High Arctic ice shelves could all be fragmented in a matter of years. Sea ice has thinned by 40% since 1960.

The *Arctic Climate Impact Science – An Update Since the Arctic Climate Impact Assessment* report notes that there could be factors contributing to climate change that have not yet been considered. The report estimates that the summer ice pack could be gone in 5 to 32 years.

Release of long-stored methane gas from the thawing of the Arctic has already begun and is one of the phenomena that could have catastrophic warming effects. Japan plans to extract permafrost methane, which some fear might cause the release of huge volumes of gas with possible catastrophic environmental consequences.

6.4.4 Computer Modeling

The results of a new study by MIT researchers reinforce the connection between climate change and the intensity of storms, showing an increase in the intensity and duration of tropical cyclones.

6.4.5 Post-Kyoto Negotiations

The first session of the post-Kyoto treaty working groups to advance the Bali roadmap was held. Seven more sessions will occur—three this year and four in 2009. The main disagreements at this first meeting focused on the Japanese proposal for a “sectoral approach” to address greenhouse gas emission targets based on energy-efficiency standards by industry, and the concept of “measuring, reporting and verifying.”

The newly elected Australian government sponsored a 2020 summit during April 2008. A detailed response to the summit is expected from the Government by the end of 2008. The new Australian government has taken a more aggressive approach to CO₂ emissions reduction and has committed Australia to a carbon-trading scheme by 2010.

Governors of 20 U.S. states signed the Governors’ Declaration on Climate Change establishing a partnership between the states and the federal government to increase efforts to control and reduce greenhouse gas emissions. Premier Jean Charest of Quebec, Canada, announced that Quebec is joining the Western Climate Initiative, which calls for a 15% reduction in greenhouse gas emissions below 2005 levels by 2020.

While negotiations for a post-2012 treaty continue, questions are growing about better enforcement mechanisms of the Kyoto Protocol to compel governments to respect their commitments.

Military Implications:

[Same as previous on similar issues] Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.

Sources: (see a more expanded list in the [Appendix](#))

Freshening of deep Antarctic waters worries experts

http://www.enn.com/top_stories/article/34921

'No Sun link' to climate change <http://news.bbc.co.uk/2/hi/science/nature/7327393.stm>

Scientists downplay global warming’s effect on hurricanes

<http://www.sott.net/articles/show/153074-Scientists-downplay-global-warming-s-effect-on-hurricanes>)

Global Hot Spots of Hunger Set to Explode

<http://ipsnews.net/news.asp?idnews=41976>

International Assessment of Agricultural Knowledge, Science and Technology for Development

<http://www.agassessment.org/index.cfm?Page=IAASTD%20Reports&ItemID=2713>

International Federation launches new five-year food security strategy in Africa focussing on long-term investments

<http://www.ifrc.org/Docs/News/pr08/1508.asp>

Region urged to make the environment a priority

<http://www.caribbeannetnews.com/news-7280--39-39--.html>

A Drought in Australia, a Global Shortage of Rice

http://www.nytimes.com/2008/04/17/business/worldbusiness/17warm.html?_r=1&oref=slogin

Melting mountains a "time bomb" for water shortages

<http://africa.reuters.com/wire/news/usnL14573335.html>

Town in the Andes faces crisis as glaciers melt

<http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/04/23/MNSDVIN7E.DTL>

Melting ice caps may trigger more volcanic eruptions

<http://environment.newscientist.com/article/dn13583-melting-ice-caps-may-trigger-more-volcanic-eruptions.html> (by subscription; full text in the [Appendix](#))

Arctic ice melting fast in summer sun

<http://www.thestar.com/sciencetech/article/416901>

A Storehouse of Greenhouse Gases Is Opening in Siberia

<http://www.spiegel.de/international/world/0,1518,547976,00.html>

'Flammable ice' could be mined for fuel

<http://environment.newscientist.com/channel/earth/energy-fuels/mg19826523.400-methane-could-be-mined-from-beneath-permafrost.html>

New MIT study validates hurricane prediction

<http://web.mit.edu/newsoffice/2008/emanuel-paper-0417.html>

Bangkok Climate Change Talks - 31 March to 4 April 2008

http://unfccc.int/meetings/intersessional/awg-lca_1_and_awg-kp_5/items/4288.php

Australia 2020 <http://www.australia2020.gov.au/>

Governors Call for Federal-State Climate Change Partnership

<http://www.ens-newswire.com/ens/apr2008/2008-04-18-01.asp>

Do global warming pledges matter?

<http://www.terradaily.com/2007/080403023938.mw16xxva.html>

6.5 Nanotechnology Safety Issues

Some noteworthy nanotechnology safety activities from this month (more detailed descriptions of each are available in the [Appendix](#)) are:

- EU nanotech advisory research project "ObservatoryNANO" has begun operation
- *New Analysis of Nanotech Risk Assessment Funding* found that for fiscal year 2006 only \$13 million—representing less than 1% of the \$1.4 billion U.S. National Nanotechnology Initiative budget—was spent on federal research projects highly relevant to addressing possible environment, health and safety risks related to nanotechnology.
- Nanotech 2008 Conference Scheduled for Boston in June 1-5, will have two sessions on "Environmental Health and Toxicology"

Military Implications:

[Same as previous on this issue] Military personnel concerned with nanotech issues should contribute their views to these activities. Also, relevant military personnel should review the information generated by such activities to improve military and contractor practices, as well as to assist and cooperate with the organizations working on those issues for enriching their studies.

Sources:

Observatory-NANO project <http://www.observatory-nano.eu>

ObservatoryNANO project kicks off in London

<http://nanoforum.org/nf06~modul~showmore~folder~99999~scc~news~scid~3573~.html?action=longview&> (free membership required; full text in the [Appendix](#))

ObservatoryNANO: responsible nanotechnology for socio-economic benefit

<http://www.safenano.org/SingleNews.aspx?NewsID=382>

Project on Emerging Nanotechnologies [sic] – Risk Research Inventory Update Analysis

http://www.nanotechproject.org/process/assets/files/6691/ehs_risk_research_inventory_080416_final.pdf

Europe Spends Nearly Twice as Much as U.S. on Nanotech Risk Research

<http://www.nanotechproject.org/news/archive/ehs-update/>

NSTI Nanotech 2008 <http://nsti.org/Nanotech2008/>

Item 7. Reports Suggested for Review

7.1 Addressing Security Aspects of Climate Change

Delivering Climate Security: International Security Responses to a Climate Changed World, by Nick Mabey, published by Britain's Royal United Services Institute for Defence and Security Studies, outlines a framework for climate security analysis and some of its implications for security policy, practice and institutional change. Noting that international response to climate security threats has been 'slow and inadequate', it recommends that nations integrate climate change into their security policy to prepare for worst-case scenarios. Otherwise, says the author, climate change might have security implications of "similar magnitude to the World Wars, but which will last for centuries."

Military Implications:

The report appears to be a good information source for security sector actors who have to prepare contingency plans to respond to the challenges of climate change.

Sources:

Delivering Climate Security: International Security Responses to a Climate Changed World

<http://www.informaworld.com/smpp/title~content=g792406239~db=mass>

Climate change 'may put world at war'

<http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/04/23/eaclimate123.xml>

7.2 Terrorists Could Tap Pharmaceutical Toxins

Old Plagues, New Threats by the Cooperative Nonproliferation Program at the Stimson Center is a comprehensive analysis of the state of monitoring and regulation of emerging products and technologies. It uses the pharmaceutical industry as a case study and outlines the threats—from research and distribution to injection into patients of products derived from select agents. The growing interest in dangerous pathogens and toxins increases the potential of their use in biological weapons by nefarious actors. Lack of adequate regulations increases the possibility of such scenarios. [See also *Accelerating Synthetic Biology Applications Need Better Monitoring and Regulation* in July 2007 and other similar items in previous environmental security reports.]

Military Implications:

This book should be reviewed by those responsible for anticipating vulnerabilities to bioterrorism.

Source:

Pharmaceutical Terrorism—The Bane of Biotech

<http://www.stimson.org/pub.cfm?ID=596>

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

Item 2. Half of Transported European Hazardous Waste Could Be Illegal—How Much More Elsewhere?

RE: -- Press Releases March 2008 - Environment crime now high on the world agenda - United Nations Environment Programme (UNEP) --

From: Ezra Clark <ezra.clark@unep.fr>

To: jglenn@igc.org

Date: Apr 28 2008 - 10:55am

Dear Jerome, I am following up on my email of 9 April relating to the value of international illegal trades. As previously mentioned, I attended a workshop on illegal trade (In Chatham House, London December 2007) at this a paper was presented which gave a concise description and referenced estimates of illegal trade in ODS, hazardous waste, wildlife, timber and illegal fishing. The final report of this meeting and background papers is now available and can be found at:

http://www.illegal-logging.info/item_single.php?item=event&item_id=138&approach_id=8

http://www.illegal-logging.info/item_single.php?item=event&item_id=138&approach_id=8 or:

http://www.illegal-fishing.info/item_single.php?item=event&item_id=139&approach_id=8

http://www.illegal-fishing.info/item_single.php?item=event&item_id=139&approach_id=8 On

page 5 of a background paper (International Environmental Crime, Sustainability and Poverty) is the following summary which I hope is useful, (references can be found in the paper): Box 1:

Global estimates of illegal trade In the mid-1990s, illegal trade in chlorofluorocarbons (CFCs) was estimated at up to 20,000 tonnes per year, worth US\$ 150-300 million – equivalent to over 12% of global ODS production (EIA, 2006a). More recent estimates, from the early 2000s, suggest that smuggling of ODS represents 10-20% of the legitimate trade in ODS. This is equivalent to 7,000 – 14,000 tonnes per year, with a value of US\$ 25-60 million (EIA, 2006a; CH & EIA, 2006). There is a huge international trade in hazardous waste – both legal and illegal. Reports made to the Basel Convention suggest that there are at least 8.5 million tonnes of hazardous waste being moved between countries each year (Basel Convention, 2006). The proportion of this that is illegal is unknown, however, one project undertaken in 13 European countries found that over half of the waste shipments examined were illegal (IMPEL-TFS Seaport II, 2006). In 2000, the US Government estimated that those engaged in the smuggling and dumping of hazardous waste and trafficking of natural resources earned about US\$22-31 billion annually, of which US\$ 10-12 billion was from the smuggling of waste (USJD, 2000). Estimates for the scale of the illegal wildlife trade range from US\$ 5-20 billion p.a. (Brack, 2007b; Lin, 2005; USJD, 2000). Research of the global trade in wood products estimated that in 2002, 12% and 17% (by volume) of roundwood exports of softwood and hardwood respectively were of 'suspicious origin'. For

hardwood lumber exports this figure was 23% and for hardwood plywood exports, 30%. In terms of the value of this trade, this study estimated that 5-10% of global timber production may be illegal (Seneca Creek Associates & Wood Resources International, 2004). The estimated annual value of IUU fishing, globally, is between \$US 4.2 billion to 9.5 billion. This figure came from extrapolating the findings of a study of 10 developing countries in Africa and Oceania. IUU fishing was thought to account for 23% of the value of the total declared catch in these countries (MRAG, 2005). Please let me know if any more information is required Best regards Ezra Clark

----- Dr Ezra Clark OzonAction United Nations Environment
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Switchboard: +33 (0)1 44 3

Item 5. Technological Advances with Environmental Security Implications

5.2 Increasing Energy Efficiency Technologies

5.2.3 New Material for Storing Hydrogen

Physicists find new material for storing hydrogen

Mar 31, 2008

<http://physicsworld.com/cws/article/news/33614> (Requires registration)

Physicists in the US may have found a promising new class of material that can absorb and store large amounts of hydrogen. Adam Phillips and Bellave Shivaram of the University of Virginia measured around 12% by weight of hydrogen uptake in the metal-based composites. This is significantly higher than the target of 5.4wt% set by the US Department of Energy to support the development of hydrogen-powered vehicles — although the physicists say much work still needs to be done.

A low-cost, high-capacity hydrogen-storage medium is essential for the commercialization of hydrogen fuel-cell technologies in the future. While scientists have investigated various classes of material, such as carbon nanotubes, hydrogen-clathrate-hydrates and other nanostructured materials over the past few decades, no one satisfactory material has yet been found.

Transition metal-ethylene complexes

Now, Phillips and Shivaram report on transition metal-ethylene complexes with promising hydrogen-storage properties (Phys. Rev. Lett. 100 105505). "Several theory papers have suggested that if you isolate a titanium (Ti) atom with a carbon nanostructure, the Ti is capable of weakly bonding with three to five hydrogen molecules," explained Phillips. "Our experiments focused on a Ti-ethylene structure predicted to bond up to 12wt% for 1:1 Ti:ethylene or 14wt% 2:1 Ti:ethylene — in agreement with our results."

Phillips and Shivaram obtained their results by first vaporizing Ti atoms in an ethylene atmosphere. The Ti atoms are thought to bond with the ethylene before being deposited on surface acoustic wave (SAW) mass sensors. Once the deposition is complete, the researchers evacuate the excess ethylene from the chamber and introduce one atmosphere of hydrogen.

It is critical to say that our work is at a very early stage Adam Phillips, University of Virginia

Throughout the process, the scientists measure the mass of hydrogen accumulating on the sensors using a nanogravimetry technique. Here the resonant frequency of the SAW device decreases with increasing mass, so the precise amount of hydrogen loading onto the Ti-ethylene complexes can be determined by simply measuring this frequency.

'Goldilocks' regime

"We believe that isolated transition metals (as we think we have) can bond to hydrogen molecules in a 'Goldilocks' regime — stronger than physisorption but weaker than chemisorption," said Phillips. This is an advantage because most physisorption materials absorb hydrogen only at very low temperatures. In contrast, chemisorption materials dissociate the hydrogen molecule during absorption, which means that the materials form strong bonds with hydrogen that require elevated temperatures.

The researchers now plan to scale up the nanogram quantities of materials that they have studied. They also hope to investigate the bonding mechanism by vaporizing Ti in gases, such as benzene and other cyclic organic compounds.

"It is critical to say that our work is at a very early stage," added Phillips. "While we have measured the hydrogen uptake, we have not yet been able to determine how the material desorbs. However, we are very optimistic about the possibility of scaling up and overcoming many of the other hurdles we now face."

Research paper: Phys. Rev. Lett. 100 105505

6.4 Climate Change

6.4.1 Scientific Evidence

Scientists have detected dilution in salinity of the sea around Antarctica and warn that this could have significant effects on the world's climate and ocean currents. The so-called Antarctic bottom water of this region controls the system of ocean currents spanning the Southern, Pacific, Indian and Atlantic Oceans that shift heat around the globe. The phenomenon might be due to global warming, and in its turn will influence climate change.

For the past 20 years, no significant correlation can be established between climate change and the Sun's activity, found UK Lancaster University scientists, using three different research methods. The findings support the assessment of the Intergovernmental Panel on Climate Change that man-made greenhouse gas emissions outweigh solar activity variations as a cause of global warming.

Climate change-induced effects might prove costly for the US. Although there is no consensus on the link between global warming and the number of hurricanes, scientists agree that climate change could increase storms' damaging forces. The National Hurricane Center estimates that the US might be hit by a hurricane that could cause more than \$100 billion in damage. Highly populated coastal areas are at highest risk. A category 5 hurricane could produce at least \$140 billion in damage to South Florida.

6.4.2 Food and Water Security

Continuous escalation of food prices worldwide increases distress in poor regions, raising the danger of social and political unrest. Demonstrations and/or riots due to unaffordable basic needs have already erupted in Egypt, Cameroon, Haiti, Burkina Faso, Indonesia, Ivory Coast, Mauritania, Mozambique and Senegal. FAO says that six countries have an "exceptional shortfall"

of food supplies: Lesotho, Somalia, Swaziland, Zimbabwe, Iraq, and Moldova, while another six suffer of “widespread lack of access” to food: Eritrea, Liberia, Mauritania, Sierra Leone, Afghanistan and North Korea. Out of the estimated ~40 countries at “food crisis” risk, some 20 are or were recently affected by internal conflicts, and 21 have suffered from floods, droughts, and other weather disasters.

The International Assessment of Agricultural Science and Technology for Development *Synthesis Report* presents statistical analyses of basic food prices, an assessment of the state of world agricultural regions and threats to production; suggests several strategies and methods to increase agricultural efficiency, such as how to produce food that is less dependent on fossil fuels and favors natural fertilizers and traditional seeds; and offers suggestions for rational use and preservation of soil and water supply.

The International Federation of Red Cross and Red Crescent Societies launched a new five-year food security strategy in Africa focussing on long-term investments to improve food security programmes in 15 African countries. The new plan will include new technologies, seed banks and soil nutrient management, and the establishment of community-based food security monitoring systems.

The Twenty-Fifth Special Meeting of the Council for Trade and Economic Development (COTED) on the Environment held in Greater Georgetown, Guyana, April 17-18, 2008 focused on critical environmental issues that affect the lives of people of Small Island Developing and Low-Lying Coastal States. It was agreed that the Caribbean Community Environmental and Natural Resource Framework should address adaptation to climate change effects and food security and freshwater resources.

In Australia, a six-year-long drought reduced Australia’s rice crop by 98% affecting local population, prices, and importing countries’ food source.

A conference hosted by the European Water Forum in the European Parliament on 16 April increased the warnings of growing water scarcity concerns, calling for speedy solutions to combat water shortages, which might include higher water prices to deter overuse.

In order to assist countries to adopt a new strategy for addressing food and water security by engaging international action to combat desertification, land degradation and drought, the UN Convention to Combat Desertification Secretariat is convening a high-level policy dialogue to be held in Bonn, Germany on May 27.

Water security will also be affected by earlier melting of glaciers and mountain snow, leaving millions of people in need during the summer when rainfall is lower, warn scientists. The earth’s sub-tropic zones, home to 70% of the world’s population, are the most vulnerable. The areas most at risk include parts of the Middle East, southern Africa, the United States, South America and the Mediterranean.

The fast melting high altitude glaciers in Andean mountains alter eco-systems, affecting the livelihood of people of Peru, Ecuador and Bolivia. The IPCC estimated that rising temperatures could melt most of Latin America’s glaciers by 2022. In some regions, demand for water might exceed supply as soon as 2009.

6.4.3 Melting Glaciers and Sea Ice

Melting ice caps because of global warming may trigger more volcanic eruptions, scientists estimate. Thinning ice and thus reduced weight on the earth’s crust changes the geological stresses inside the crust in general, and also intensifies the rate of magma melting, increasing the possibility of eruptions, explain scientists Carolina Pagli of the University of Leeds, UK, Freysteinn

Sigmundsson of the University of Iceland, and Bill McGuire of University College London in the UK.

Arctic permanent ice shelves are breaking off or cracking at a higher rate than feared, noted polar ice researchers who accompanied Canadian Rangers on a patrol around Ellesmere Island. They estimate that the High Arctic ice shelves could all be fragmented in a matter of years. Another study, by scientists of the National Center for Atmospheric Research (NCAR) and Colorado State University (CSU), reveals that new Arctic sea ice is on average so extremely thin, that it melts under the sunshine of clear summer skies it once could survive. U.S. submarines' readings reveal a 40% reduction in sea ice thickness since 1960.

The *Arctic Climate Impact Science – An Update Since the Arctic Climate Impact Assessment* report, produced for the World Wildlife Fund, presented to the Arctic Council, says that there could be factors contributing to climate change that were not even considered, since the real changes are happening much faster than predicted by computer models and scientists. The report estimates that the summer ice pack could be gone in 5 to 32 years.

Release of long-stored methane gas from the thawing of the Arctic is one of the phenomena that could have catastrophic warming effects. At the annual conference of the European Geosciences Union held in Vienna, Russian polar scientists presented evidence that the first stages of melting have already begun off the coast of Siberia, as well as on land in northern Siberia.

There is research underway for the use of this methane as fuel. The state-owned Japan Oil, Gas and Metals National Corporation announced that it wants to extract some 7 trillion tonnes of methane estimated to exist in Japanese coastal waters. However, there are fears that this might release huge volumes of gas with possible disastrous environmental consequences.

6.4.4 Computer Modeling

The results of a new study by MIT researchers reinforce the connection between climate change and the intensity of storms. The new findings, based on pure theoretical computer simulation analysis using the Global Circulation Models, are consistent with the results of an earlier study, based on historical data, which showed a near doubling in the intensity of Atlantic storms over the last 30 years. Both studies confirm an increase in the intensity and duration of tropical cyclones, but, as for the future, many clarifications are still needed to determine the effects of global warming and CO₂ on storms' number and intensity.

6.4.5 Post-Kyoto Negotiations

The first session of the working groups for negotiating a post-Kyoto treaty to address greenhouse gas emissions reductions took place from March 31 to April 4, 2008 in Bangkok, Thailand. Delegates from 163 countries participated. The main outcome is a work plan to advance the Bali roadmap. Many delegates proposed workshops on issues they wanted to be addressed by the new treaty. Generally, the discussions went well, the main disagreement area being the Japanese proposal on a "sectoral approach" for greenhouse gas emissions targets based on energy-efficiency standards by industry, and the concept of "measuring, reporting and verifying." Seven more sessions will be held—three this year and four in 2009.

The next meeting will be held in June, in Bonn, addressing developing countries' adaptation strategies and clean technology transfer. In-depth discussions of the Japanese proposal on greenhouse gas emissions and energy efficiency targets were postponed to the August meeting to be held in Ghana. China, India, and other developing countries strongly oppose the Japanese plan that would require developing countries to stabilize greenhouse gases over the next 10–15 years

and cut them in half by 2050. Significant disagreements remain over demands from the U.S. and Japan for developing countries to accept binding targets as part of a pact to stabilize greenhouse gases in the next 10–15 years and cut them in half by 2050.

Aviation and shipping industries account for some 5%-8% of greenhouse gas emissions and are sectors not covered by the Kyoto Protocol, due to the difficulty in classifying them under individual nations. However, the European community estimates that emissions might grow by 32% from shipping and 90% from aviation. Therefore, Europe is advocating clear and meaningful greenhouse gas emission reduction targets for the two sectors.

The newly elected Australian government sponsored a 2020 summit during April 2008. One thousand selected invitees spent two days considering ten themes, including Australia's long-term role in the region. A detailed response to the summit is expected from the Government by the end of 2008. The new Australian government has taken a more aggressive approach to CO₂ emissions reduction and the 2020 summit held in April 2008 encouraged the government to further take a regional lead in this area. The government has committed Australia to a carbon-trading scheme by 2010.

Governors of 20 U.S. states signed the Governors' Declaration on Climate Change at the 2008 Conference on Climate Change held at Yale University. The Declaration is establishing a partnership between the states and the federal government to increase efforts to control and reduce greenhouse gas emissions. At the same meeting, Premier Jean Charest of Quebec, Canada, announced that Quebec is joining the Western Climate Initiative, which calls for a 15% reduction in greenhouse gas emissions below 2005 levels by 2020.

While negotiations for a post-2012 treaty continue, questions are growing about better enforcement mechanisms of the Kyoto Protocol to compel governments to respect their commitments. Change of government shouldn't allow policy changes relative to a country's international commitments and ratified regulations. Canada, Japan and some southern European countries are all well behind their targets. "The biggest concern comes from countries like Canada that have openly begun voicing doubts about whether they will comply or even care about complying," said Antonio Hill, from Oxfam.

Sources: (a more expanded list)

6.4.1 Scientific Evidences

Freshening of deep Antarctic waters worries experts

http://www.enn.com/top_stories/article/34921

'No Sun link' to climate change <http://news.bbc.co.uk/2/hi/science/nature/7327393.stm>

Scientists downplay global warming's effect on hurricanes

<http://www.sott.net/articles/show/153074-Scientists-downplay-global-warming-s-effect-on-hurricanes>)

6.4.2 Food and Water Security

Global Hot Spots of Hunger Set to Explode

<http://ipsnews.net/news.asp?idnews=41976>

International Assessment of Agricultural Knowledge, Science and Technology for Development

<http://www.agassessment.org/index.cfm?Page=IAASTD%20Reports&ItemID=2713>

Modern agricultural practices must change, concludes report to be presented at UNESCO

http://portal.unesco.org/en/ev.php-URL_ID=42192&URL_DO=DO_TOPIC&URL_SECTION=201.html

U.N. Panel Urges Changes to Feed Poor While Saving Environment

http://www.nytimes.com/2008/04/16/world/europe/16food.html?_r=1&ref=world&oref=slogin

International Federation launches new five-year food security strategy in Africa focussing on long-term investments

<http://www.ifrc.org/Docs/News/pr08/1508.asp>

Region urged to make the environment a priority

<http://www.caribbeannetnews.com/news-7280--39-39--.html>

A Drought in Australia, a Global Shortage of Rice

http://www.nytimes.com/2008/04/17/business/worldbusiness/17warm.html?_r=1&oref=slogin

Water scarcity concerns growing

<http://www.planet2025news.net/ntext.rxml?id=9837&photo=>

Food, land crisis linked to environmental degradation, UNCCD says

http://africasciencenews.org/asns/index.php?option=com_content&task=view&id=314&Itemid=1

Melting mountains a "time bomb" for water shortages

<http://africa.reuters.com/wire/news/usnL14573335.html>

Town in the Andes faces crisis as glaciers melt

<http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/04/23/MNSDVIN7E.DTL>

6.4.3 Melting Glaciers and Sea Ice

Melting ice caps may trigger more volcanic eruptions

<http://environment.newscientist.com/article/dn13583-melting-ice-caps-may-trigger-more-volcanic-eruptions.html> (by subscription only; full text in this [Appendix](#))

Cracks in Arctic ice shelves even worse than feared: scientist

<http://www.cbc.ca/canada/north/story/2008/04/16/arctic-ice.html>

Arctic ice melting fast in summer sun

<http://www.thestar.com/sciencetech/article/416901>

Arctic Ice More Vulnerable to Sunny Weather, New Study Shows

<http://www.ucar.edu/news/releases/2008/arcticice.jsp>

Climate change hitting Arctic faster, harder - Polar bears may be at even greater risk

<http://www.wwf.ca/NewsAndFacts/NewsRoom/default.asp?section=archive&page=display&ID=1586&lang=EN>

Arctic is thawing faster than expected, report says

<http://www.theglobeandmail.com/servlet/story/LAC.20080425.CLIMATE25//TPStory/Environment>

A Storehouse of Greenhouse Gases Is Opening in Siberia

<http://www.spiegel.de/international/world/0,1518,547976,00.html>

'Flammable ice' could be mined for fuel

<http://environment.newscientist.com/channel/earth/energy-fuels/mg19826523.400-methane-could-be-mined-from-beneath-permafrost.html>

Japan's Arctic methane hydrate haul raises environment fears

<http://www.timesonline.co.uk/tol/news/environment/article3740036.ece>

6.4.4 Computer Modeling

New MIT study validates hurricane prediction

<http://web.mit.edu/newsoffice/2008/emanuel-paper-0417.html>

Climate Change Likely To Intensifies Storms, New Study Confirms

<http://www.sciencedaily.com/releases/2008/04/080417170213.htm>

MIT study confirms that climate change creates stronger storms

<http://www.planet2025news.net/ntext.rxml?id=9769&photo=>

Revisiting the global warming-hurricane link

<http://www.csmonitor.com/2008/0414/p02s04-wogi.html>

6.4.5 Post-Kyoto Negotiations

Nations agree to look at planes, ships in climate deal

http://afp.google.com/article/ALeqM5j_veCL4RvqgD9xgkgi9R1JdBEjBA

UN Climate Talks Agree on Agenda

<http://ap.google.com/article/ALeqM5jRIJomFc4kOiCDSizIKDQ6uLFzvwD8VR8IRG0>

Tough road lies ahead for global climate deal

http://www.mg.co.za/articlepage.aspx?area=/breaking_news/breaking_news_international_news/&articleid=336321

Summary of The First Session of The Ad Hoc Working Group on Long-Term Cooperative Action and The Fifth Session of The Ad Hoc Working Group on Further Commitments For Annex I Parties Under The Kyoto Protocol

<http://www.iisd.ca/vol12/enb12362e.html>

Bangkok Climate Change Talks - 31 March to 4 April 2008

http://unfccc.int/meetings/intersessional/awg-lca_1_and_awg-kp_5/items/4288.php

Europe for aviation, shipping cuts

<http://howrah.org/World/8720.html>

Australia 2020 <http://www.australia2020.gov.au/>

Australia 2020 Summit a powerful symbol: editorial

<http://www.news.com.au/couriermail/story/0,23739,23575926-13360,00.html>

Governors Call for Federal-State Climate Change Partnership

<http://www.ens-newswire.com/ens/apr2008/2008-04-18-01.asp>

Do global warming pledges matter?

<http://www.terraily.com/2007/080403023938.mw16xxva.html>

Melting ice caps may trigger more volcanic eruptions

NewScientist.com news service, 03 April 2008, By Catherine Brahic

<http://environment.newscientist.com/article/dn13583-melting-ice-caps-may-trigger-more-volcanic-eruptions.html> (by subscription)

Vatnajökull in the south-east is the largest ice cap in Iceland and conceals several volcanoes (Image: NASA)

A warmer world could be a more explosive one. Global warming is having a much more profound effect than just melting ice caps – it is melting magma too.

Vatnajökull is the largest ice cap in Iceland, and is disappearing at a rate of 5 cubic kilometres per year.

Carolina Pagli of the University of Leeds, UK, and Freysteinn Sigmundsson of the University of Iceland have calculated the effects of the melting on the crust and magma underneath.

They say that, as the ice disappears, it relieves the pressure exerted on the rocks deep under the ice sheet, increasing the rate at which it melts into magma. An average of 1.4 cubic kilometres has been produced every century since 1890, a 10% increase on the background rate.

Frequent eruptions

In Iceland there are several active volcanoes under the ice. The last big eruption was in 1996 at Gjálp, and before then in 1938 – a gap of 58 years. But Pagli and Sigmundsson say that the extra magma produced as the ice cap melts could supply enough magma for similar eruptions to take place every 30 years on average.

Predicting the eruptions precisely will be tricky, though, as the rate of magma migration to the surface is unknown.

The situation in Iceland does not necessarily mean magma will be melting faster around the world. Vatnajökull sits atop a boundary between plates in the Earth's crust, and it is this configuration that is allowing the release in pressure to have such a great effect deep in the mantle.

But the thinning ice has another effect on volcanoes, which will be more widespread.

As the amount of weight on the crust changes, geological stresses inside the crust will also change, increasing the likelihood of eruptions. "Under the ice's weight, the crust bends and as you melt the ice the crust will bounce up again," explains Bill McGuire of University College London in the UK, who was not involved in the study.

Unexpected activity

Pagli say places likely to be at increased risk of eruption due to ice-melt include Antarctica's Mount Erebus, and the Aleutian Islands and other Alaskan volcanoes.

The shifting stress might even cause eruptions in unexpected places.

"We think that during the Gjálp eruption, magma reached the surface at an unusual location, mid-way between two volcanoes, because of these stress changes," says Pagli.

McGuire thinks the Vatnajökull study is based on "perfectly reasonable" physics. However, he says that climate change presents an even more explosive threat. "It's not just unloading the crust that triggers volcanic activity but loading as well."

He and his team are looking into the effects that rising sea levels – also a consequence of melting ice caps – will have on volcanoes. "We are going to see a massive increase in volcanic activity

globally," he told New Scientist. "If we look back at previous warm periods, that is what happened."

Journal reference: Geophysical Research Letters

6.5 Nanotechnology Safety Issues

6.5.1 EU Establishes Nanotech Advisory Research Project

The EU FP7 (EU's Seventh Research Framework Programme) project "ObservatoryNANO" has begun operation. According to nanoforum.org, it is funded for four years and "will collate and analyze data regarding scientific and technological (ST) trends and economic realities and expectations. The ST and economic analysis will be further supported by assessment of ethical and societal issues, impacts on health, environment and safety, as well as regulation, standardization, and legislative issues."

Sources:

Observatory-NANO project <http://www.observatory-nano.eu>

ObservatoryNANO project kicks off in London

<http://nanoforum.org/nf06~modul~showmore~folder~99999~scc~news~scid~3573~.html?action=longview&> (free membership required; full text of the article in this [Appendix](#))

ObservatoryNANO: responsible nanotechnology for socio-economic benefit

<http://www.safenano.org/SingleNews.aspx?NewsID=382>

6.5.2 New Analysis of Nanotech Risk Assessment Funding

New Analysis of Nanotech Risk Assessment Funding by the Project on Emerging Nanotechnologies, analyzing nanotech spending for fiscal year 2006, found that only \$13 million—representing less than 1% percent of the \$1.4 billion U.S. National Nanotechnology Initiative budget—was spent on federal research projects highly relevant to addressing possible environment, health and safety risks related to nanotechnology. The same year, European countries invested nearly double—\$24 million —on similar nanotech risk-assessment projects. Draft legislation proposed by the U.S. House of Representatives Science Committee would require that in the future, a minimum 10% of the NNI budget be devoted to risk assessment research.

Sources:

Project on Emerging Nanotechnologies – Risk Research Inventory Update Analysis

http://www.nanotechproject.org/process/assets/files/6691/ehs_risk_research_inventory_080416_final.pdf

Europe Spends Nearly Twice as Much as U.S. on Nanotech Risk Research

<http://www.nanotechproject.org/news/archive/ehs-update/>

6.5.3 Nanotech 2008 Conference Scheduled for Boston in June

The NSTI Nanotech 2008 Conference is scheduled to be held in Boston 1-5 June. Two sessions on "Environmental [sic], Health and Toxicology", including a paper on "Legislative, Regulatory [sic] and Risk Management for Nanotech EHS", are on the program for 5 June.

Source:

NSTI Nanotech 2008 <http://nsti.org/Nanotech2008/>

ObservatoryNANO project kicks off in London

nanoforum.org, Newsletter #29

The FP7 project ObservatoryNANO got underway on Monday 7th April 2008 when it held its kick-off meeting in London. This €4 M Support Action is funded for four years from April 1st and brings together 16 leading EU organizations from 10 European States. It will collate and analyze data regarding scientific and technological (ST) trends and economic realities and expectations. The ST and economic analysis will be further supported by assessment of ethical and societal issues, impacts on health, environment and safety, as well as regulation, standardization, and legislative issues. Analyses will be elaborated through constructive discourse with leading academics, industrialists, investors, and other key stakeholders. The consortium has established liaisons with relevant groups within international organizations such as the EPO, the OECD and the ISO, and will establish liaisons with relevant ETPs, ERA NETs, and other EU-funded projects, to maximize the impact of its own and others work. The purpose of this integrated approach is to develop validated methodologies that yield accurate indicators of the socio-economic impact of N&N RTD.

The ultimate goal of the ObservatoryNANO project is to establish a permanent European Observatory on Nanotechnologies, to provide ongoing, independent support to decision-makers. This will take account of the methodologies developed and validated during the project, the functions and activities of other similar initiatives, and input from a balanced Governing Board of high-level stakeholders that will be formed during the second year of the project.

ObservatoryNANO project kicks off in London

<http://nanoforum.org/nf06~modul~showmore~folder~99999~scc~news~scid~3573~.html?action=longview&> (free membership required)